Name:

at1124exam: Radicals and Squares (v904)

Question 1

Simplify the radical expressions.

$\sqrt{8}$	$\sqrt{99}$	$\sqrt{50}$
$\sqrt{2 \cdot 2 \cdot 2}$	$\sqrt{3 \cdot 3 \cdot 11}$	$\sqrt{5 \cdot 5 \cdot 2}$
$2\sqrt{2}$	$3\sqrt{11}$	$5\sqrt{2}$

Question 2

Find all solutions to the equation below:

$$2\left((x+8)^2+9\right) \;=\; 50$$

First, divide both sides by 2.

$$(x+8)^2+9=25$$

Then, subtract 9 from both sides.

$$(x+8)^2=16$$

Undo the squaring. Remember the plus-minus symbol.

$$x+8=\pm 4$$

Subtract 8 from both sides.

$$x=-8\pm 4$$

So the two solutions are $x=-4$ and $x=-12$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 10x = 39$$

$$x^2 - 10x + 25 = 39 + 25$$
$$x^2 - 10x + 25 = 64$$
$$(x-5)^2 = 64$$
$$x - 5 = \pm 8$$
$$x = 5 \pm 8$$
$$x = 13 \quad \text{or} \quad x = -3$$

Question 4

Any quadratic function, with vertex at (h, k), can be expressed in vertex form:

$$y = a(x-h)^2 + k$$

A quadratic function is shown below in standard form.

$$y = 4x^2 + 24x + 41$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 4 .

$$y = 4(x^2 + 6x) + 41$$

We want a perfect square. Halve 6 and square the result to get 9 . Add and subtract that value inside the parentheses.

$$y = 4(x^2 + 6x + 9 - 9) + 41$$

Factor the perfect-square trinomial.

$$y = 4((x+3)^2 - 9) + 41$$

Distribute the 4.

$$y = 4(x+3)^2 - 36 + 41$$

Combine the constants to get **vertex form**:

$$y = 4(x+3)^2 + 5$$

The vertex is at point $(-3, 5)$.